

Wetland Eco Training (WET)

- Susan Dransfield,

Mary McPherson Elementary

1. Current Innovative Use of Technology

Technology is critical to competitive, contemporary education and we use it to enhance almost every subject. Our equipment is limited, but we have been able to borrow a GPS unit and digital camera for specific projects and we rely daily upon a few older in-class desktops with internet access and some desktop publishing capacity. The following sample of activities illustrates the power of technology for students with even our current limited capacity.

Math & Science. Students explore the many real-world applications of math to learn that “math is the language of science.” We use the computer to manipulate numbers and depend upon computer generated spreadsheets, charts, graphs, and tables to record, organize and analyze data as we use the Scientific Method. We generate presentations of our conclusions with digital images integrated to record visual changes and progress during labs and to document conclusions.

To study and mark the Fall Equinox, we began with the goal of predicting the exact time and location of the sunrise. After using the Internet to learn about latitude and longitude, we borrowed a GPS unit to determine the exact position of our playground. After marking a central spot, students used charts found on the Internet to determine the exact time of sunrise at our location. As the mountains to the east of Meridian complicated our calculations, the students turned to a compass to find the exact point where the sun would rise on September 22 and calculated the mountain’s angle above the horizon with a protractor. Students used these varied techniques and tools to predict that the sun would peak over the mountain at 7:38 a.m. We invited our families to join us for a program and refreshments. One of the student speakers explained how Idaho natives marked rocks near the Snake River to track the sunrise and the seasons. Sunrise was greeted with awe followed by jubilant cheers. Digital pictures preserved the moment.

To participate in NASA’s Globe Contrail Project, students researched NASA’s website to learn about clouds and types of condensation trails left by planes. At exactly 11:00 a.m. on October 13th, we made our observations, then gathered and recorded our data. Using a borrowed GPS unit, each student recorded our location and augmented this data with observations of the numbers and types of visible clouds and the contrails. After documenting our findings with a digital camera, we submitted the data to NASA via email.

English & History. We use websites and programs provided by the JASON Project, NASA, Idaho Forest Products, etc. These activities tie into our curriculum and students are highly motivated to learn from them. We also use the Internet and E-mail to contact and question experts. My students initiated and created a regularly published class newspaper. This endeavor has fostered an interest in interviewing, writing articles, improving their grammar, spelling, and punctuation. As they learn to use Publisher, these skills will be of benefit when we collaborate on a book to be published this spring and consider other ways to communicate to others about the learning experiences that we have in class.

In Idaho History, we are currently taking a Virtual Tour of Idaho Counties. After using the Internet to research the counties, each student completes their “visit” with a stamp in their Idaho Passport. Each student has selected a county to research in preparation for a PowerPoint presentation to the class and community members. They will link their presentations to a map of Idaho Counties and viewers can click on a county to see a student PowerPoint presentation about that county.

Technology adds interest and excitement and I am always searching for new applications.

2. Impact of Technology on Student Performance

The proper use of technology can definitely raise student achievement. Using technology increases interest, provides motivation, improves attendance, and helps students meet state and district standards. Learning objectives and curriculum concepts are readily addressed through the use of technology.

I have observed, and studies indicate, that the educational benefits of computers and other technology are greatest when used for real-life applications. In this way, students develop creativity and higher-order thinking skills. This type of work requires students to develop organizational and self-management skills. As they begin to realize the potential for involvement in the world around them, students become hungry for more.

Wetland Eco Training (WET)

- Susan Dransfield,
Mary McPherson Elementary

Hands-on activities involve students directly with the material. I have witnessed increased interest in learning the factors that compose water quality when students know they will be testing these factors in the field. They are more excited to learn to conduct field tests when they know that they will use computers to analyze their data and then present their conclusions to the community in a professional manner. I have seen timid students proudly use a microphone to present their authentic research to an audience of nearly 100 people.

Students who have participated in real-life field studies perform better in their regular middle school science classes. They are more likely to take upper level science classes in high school. Providing these experiences for 3rd, 4th, and 5th grade students will lay a foundation that will enable them to soar to new heights in science. Comfort with technology sparks greater creativity in acquiring and applying knowledge and provides students with techniques for communicating with others about what they learned. I anticipate that students who are fortunate enough to participate in this project as 3rd, 4th, and 5th graders, will be motivated and confident enough to conduct independent research.

Technology-based projects I have conducted with classes in the past at other schools have resulted in my observation of the following growth in my students.

- Students have explored natural areas and made connections using real data.
- Students have acquired valuable skills that will transfer to other subjects and projects.
- Students have an increased interest in science and math.
- Students are motivated to learn about and care for the environment.
- Students have learned the state standards and can use that knowledge for higher-level thinking.
- Students have gained confidence in public speaking.
- Students can collaborate on a project.

The positive experiences I have had teaching students to use technology for conducting practical research, have motivated me to seek the equipment to conduct similar projects at my new school.

My interest and conviction that using technology can improve student achievement have led me to seek out 100s of hours of training. I have been invited to train other educators to conduct comparable activities. As a student in the classroom and in the field, I have felt the challenge and excitement of learning new ways to use technology to explore real-world issues. I strive to convey this excitement to my students.

Wetland Eco Training (WET)

- Susan Dransfield,

Mary McPherson Elementary

3. Learning and Creativity Fostered by Equipment Targeted in the Proposed Budget

The equipment detailed in the attached budget was carefully selected to facilitate the Wetland Eco Training Investigation. However, each item allows multiple additional uses and enhances the general curriculum and the students' continued enthusiasm for knowledge and for sharing what they learn. The cost estimates were obtained for equipment that is water resistant and rugged to withstand long-term applications by students. Every effort was made to select items that would be inexpensive to maintain, but powerful enough to serve the research and communication needs of students for several years. Identified equipment will interface with the laptop computer to facilitate documentation, analysis and applications.

Data Collection - *Hand lenses; muck boots; probes; GPS units; binoculars; kick screens; field guides, water quality site kit, groundcover analysis kits.*

Students wearing muck boots will wade into the water to take samples and to gather invertebrates. Muck boots were chosen over waders, because of the age of the students and concern for their safety. To gather invertebrates, pairs of students wearing boots will wade into slowly moving shallow water. Standing upstream, one student will kick up mud from the bottom, while the other student holds the screen and catches the particulates and invertebrates that float up. Students will use hand lenses and field guides to identify and classify the invertebrates. Invertebrates are an indicator of the health of the ecosystem and determine the types of animals that can live there. Larger animals in the ecosystem will be identified with the aid of binoculars and field guides. Temperature, pH, dissolved oxygen, turbidity, flow rate, nitrates, phosphates and other factors will be determined using probes and water quality site kits. GPS units will allow students to record the exact location of their tests. Groundcover analysis kits will be used to determine the percentage of noxious weeds versus native plants and to calculate the size and number of animals that can be supported by the groundcover.

Data Analysis/Documentation - *Digital cameras; calculators; site kit software; compound microscope; Trekker microscope with photo adapter; lab scale.*

Students will use digital cameras to document the area, their methodology, and test results. Photos will illustrate PowerPoint presentations and GIS documents. The compound microscope and Trekker microscope with photo adapter will be used in the classroom to analyze water samples and take photos through the microscope. Calculators will be used in the field and site kit software will be used in the classroom to prepare data for analysis. Groundcover samples will be measured with a scale to determine nutrition available to large and small animals.

Graphic Design, Presentations and Communication - *Digital projector; projection screen.*

The digital projector and screen will be used during instruction to prepare students to perform tests and collect data as well as to teach them to create their own presentations. Students will use them to practice and to present the conclusions of their authentic research to the community.

Logistical Support and Maintenance - *Transportation; rechargeable batteries/charger; memory; two-way radios; teacher resource kits.*

We will need bus transportation to a wetland area, batteries for the cameras and GPS units, a re-charger for the batteries, walkie-talkies to provide communication and security, and resource kits to provide hands-on investigations.

The laptop computer is critical to all segments of the activity as it allows students to load data "in the field," as well as query online sources. The laptop enables rapid data analysis, storage of digital documentation, and the eventual means by which students can share the results of their projects with other students, other schools, and the broader community.

4. Proposed Innovative Use of Technology in the Classroom

The Wetland Eco Training Investigation will link actual scientific research with computers as a means to motivate and educate students. Students will experience all the steps of the Scientific Method including those often over-looked steps, organizing and analyzing data and presenting research. As

Wetland Eco Training (WET)

- Susan Dransfield,

Mary McPherson Elementary

students work with their data, they will recognize that “math is the language of science.” The WET Project will begin during the first semester as students learn about water quality, plant identification, and ecosystems. The excitement will build as they plan how they will use their knowledge in a real field study. The second semester’s activities will prepare students for the field study by teaching them to gather and analyze data. The field study will be shortly after Spring Break and the evening presentations will be in May.

The focal point of this cooperative 3rd, 4th, and 5th grade project will be a field study at a wildlife/wetland area where the students will map the area, use probes and chemical analysis to test water quality, and document local flora and fauna. Students will use the Internet to research the area they will investigate. They will improve their skills with Word, Excel and PowerPoint and begin to use GIS software as they prepare to analyze and present their research. Each grade will concentrate on topics that reflect their state mandated curriculum. Before the field study, each group will learn about their topic and practice the tests they will use in the field. They will understand the importance of their part in the research being conducted.

Third graders will focus on plants. Prior to the field study, they will understand the role of producers in ecosystems. They will learn how to use groundcover analysis kits to evaluate and measure plant life in an area. Then, during the study, they will put their kits to work as they collaborate with experts. They will learn how scientists gather data and mathematically determine the health of an ecosystem based on the amount and quality of the plants in the area.

Fourth graders will focus on water quality. Before the field study, they will learn the factors that determine water quality. They will practice using probes, water quality site kits and microscopes. Then, during the study, they will work with experts to gather data using the same equipment they have practiced using in the classroom.

Fifth graders will focus on ecosystems. Before participating in the field study, they will learn about food webs and the interdependence within ecosystems. They will learn how to make observations and document their findings. Then, during the field study, environmental experts will join them in identifying the ecosystems present in the wetlands.

All students will be trained to use testing kits, digital cameras, and GPS (Global Positioning System) units. During the field study, students will use GPS units to mark the location of their tests and observations. This will allow future groups to compare data collected at the same site. It is my hope that this year’s 3rd grade students will return as 4th graders and again as 5th graders.

After the field study, students will use the computer to organize and analyze their data, and to draw conclusions about the water quality and its effect on the ecosystems of area. They will document the presence of noxious weeds and their impact on the native ecosystems. Students will make recommendations for the eradication of noxious weeds. Students in all three grades will use PowerPoint and digital photos to create computer presentations about their field study. These presentations will communicate their conclusions at an evening program for the community using the digital projector and projection screen. Students will also produce a “hard copy” computer-generated report that will include their research, charts, and graphs.

Through **The Wetland Eco Training Investigation**, students will learn first hand about the issues surrounding our wetland areas and experience the benefits of using computers and other technology for real-life applications.

Wetland Eco Training (WET)

- Susan Dransfield,
Mary McPherson Elementary

Qwest Foundation for Education Grant Expenditures Plan - Susan Dransfield						
Activity	100	200	300	400	500	Total
	Salaries	Benefits	Contractual Agreements	Materials & Supplies	Capital Objects	
WET Investigation						
Data Collection						
10 Hand Lenses				40		40
5 Pair Waders/Boots				400		400
Hydromania Probes Bundle/USB Link				1025		1025
5 GPS Units				750		750
2 Pair Binoculars				38		38
Kick Screens				25		25
8 Field Guides				160		160
Water Quality Site Kit				195		195
2 Groundcover Analysis Kits				50		50
Data Analysis/Documentation						
5 Digital Cameras				1750		1750
5 Calculators				75		75
Site Kit Software				42		42
Compound Microscope				175		175
Trekker Microscope/Photo Adapter				115		115
Lab Scale				35		35
Graphic Design, Presentations, Communication						
Digital Projector					2000	2000
Projection Screen				375		375
Logistical Support/Maintenance						
Bus Transportation			275			275

Wetland Eco Training (WET)

- Susan Dransfield,
Mary McPherson Elementary

Rechargeable Batteries/ Recharger				228		228
Memory				250		250
Walkie Talkie				70		70
Teacher Resource Kits I, II, III, IV				660		660
Laptop				1250		1250
Total	0	0	275	7708	2000	\$9,983